

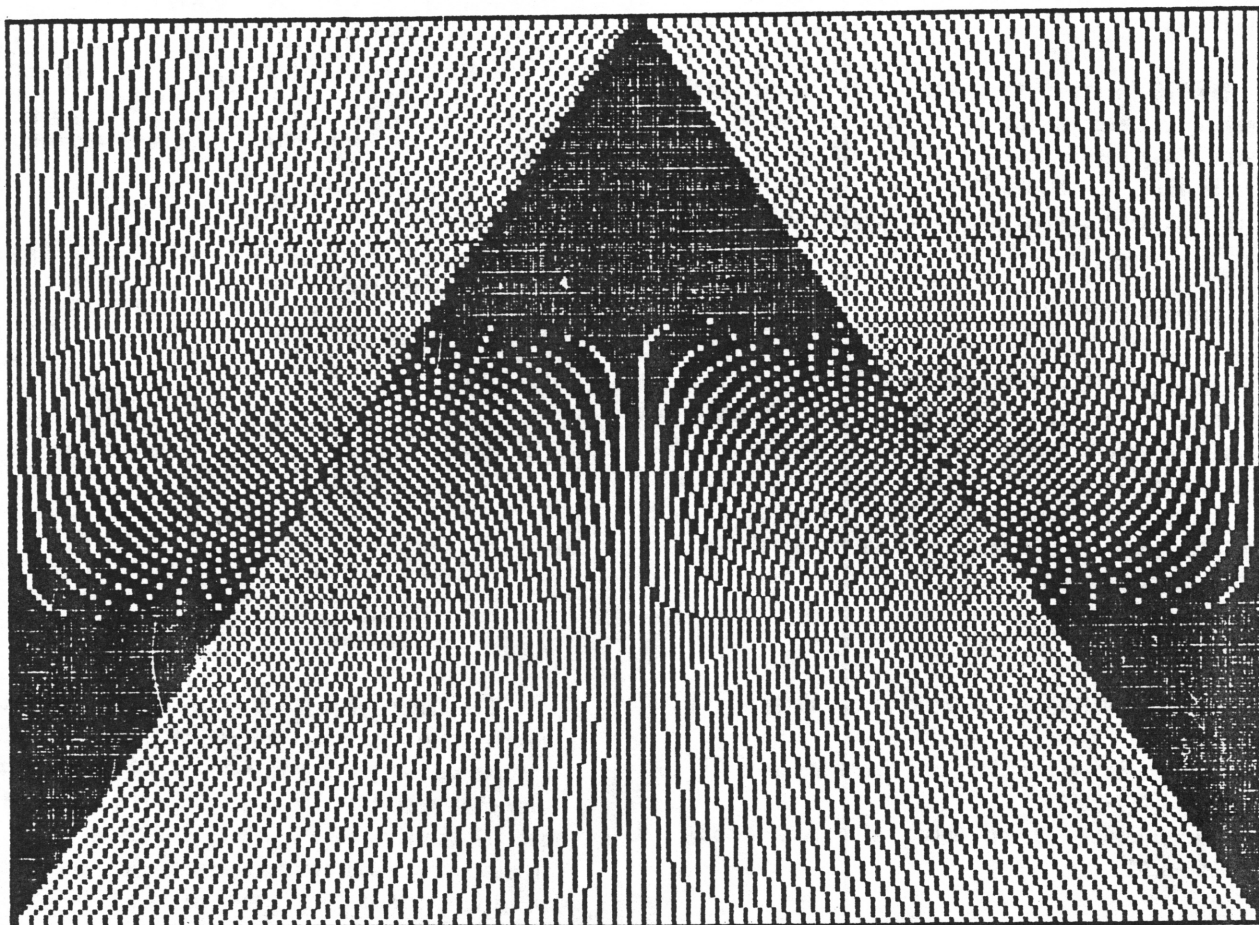
# THE RAMTOP

JANUARY

1986

PUBLISHED BY THE  
GREATER CLEVELAND SINCLAIR USERS GROUP

---



WEST SIDE GROUP MEETS AT GETHSEMANE LUTHERAN CHURCH  
14560 MADISON AVE. LAKEWOOD, OHIO 7:30 P.M.  
EVERY THIRD FRIDAY EACH MONTH (EXCEPT DECEMBER)  
CONTACT: DICK SIEG (216) 433-4387

EAST SIDE GROUP MEETS AT THE EUCLID SQUARE MALL  
IN THE EUCLIDIAN ROOM 7:30 P.M.  
EVERY FIRST FRIDAY EACH MONTH  
CONTACT: MAX SCHOENFELD (216) 371-1096

---

A short note to our friends from other newsletters and magazines. You are welcome to use any of our material, news, ads, or programs. **YOU:** (1) Tell where it came from (RAMTOP Cleveland, Ohio) and (2) The author's name that wrote the article. We would appreciate it if you would send us a copy of the newsletter that it appeared in! Unless otherwise notified we will do the same.

THANK YOU FOR YOUR INTEREST IN OUR NEWSLETTER !

---

THE TSU-BBS IS ALIVE  
SYSOP:Chris Raynak PHONE:216-327-1099 PARAMETERS:8/2/N PASSWORD:sieg

## T/S RESOURCES

	news/rumors	
hardware	software	literature
<div style="display: flex; justify-content: space-between;"> <span>Jan. 1986</span> <span>by Andy Kosiorek</span> </div>		

### Club News

The T/S Auction that was held at our December meeting was extraordinary. It may become an annual event. Many good bargains in all price ranges were available. Our thanks to all who participated. Our Club even made a small profit on the event.

### T/S COMPUTERFESTIVAL

A Midwest Timex-Sinclair Computerfest is in the planning stages. It will be held in the Cincinnati Ohio area. A possible date is the first weekend in May 1986. The meeting is being sponsored by the Cincinnati Users Group and others. The Cleveland Users Group will participate. Look for more details next month in our newsletter and other publications.

### BBS's

The MicroSystems BBS in Florida has dropped its T/S sub-board.

Have you tried the Cleveland Users Groups BBS?  
216-327-1099

The Cincinnati Users Group also has a BBS at  
513-984-8705.

### DISK DRIVES

In the last month or so there has been much discussion on the BBS's about the pros and cons of the various disk drives now available. To my knowledge there are at least 5 DD interfaces available for the 2068. T/S users have not been used to such a large choice. Our thanks to all of the manufacturers and vendors. However one of the problems with this situation is the lack of standardization of disk size and format. It will probably take the marketplace about 12 to 18 months to determine a de-facto standard. However we will always have the cassette format available to us for exchange of information.

### Magazines

"Your Spectrum," a British publication, has changed its name to "Your Sinclair" to reflect its support for the QL.

I have a very sad announcement. One of our newer members, NEIL ELIAS, just recently suffered a stroke. I know that we are all very sorry to hear this and hope that he recovers as soon as possible! If you would like to send him a card, his address is: 6805 Greenleaf Ave., Parma Hts., Oh., 44130.  
*Neil, we are all pulling for you!*

12-15-1985

## THANKYOU THANKYOU

I would like to thank all of the members of both the East Side and West Side Greater Cleveland Sinclair User's Group for their help and attendance at our Christmas party in the Euclidian Room.

Special thanks to Tom Jennens for his help in planning and setting up the room and to Andy Kosiorek for his fine job in handling the Auction. Also all of you who brought in extra refreshments and helped set up and take down afterwards.

I think what pleased me most is that no one left early and that would seem to indicate we had a successful party.

I'm looking forward to an even better party next year.

Thanks again,  
Gene Wilson

This month I got a lot of articles so if you don't see yours, it will probably be in next month's RAMTOP. Please forgive me for getting this issue out late! I have been so busy that wish that I could split into two people so as to get all the work done! Shortly I will be taking some courses in electronics and microprocessors so I may need some help in editing the RAMTOP. Thank you to all of you for your fine articles! It was a pleasure serving you last year and I am looking forward to another year of better and better RAMTOPS!

*James G. DuPuy*

### A FREE AD:

FOR SALE: 2068 and 2040 printer. Have you been contemplating getting a 2068 and printer? If so, DAVE LUCARELLI (243-6329) has one that is in good condition and as a bonus the 2068 has the Spectrum ROM with a switch! (\$95)

Well, did all of you RAMTOP readers have some Happy Holidays? I did. Since this is the first issue of the new year, I thought that I'd write about some "new" things.

For one thing, I bought a full-size printer! And with an AERCO parallel interface, my 2068 is now a nice machine. I have taken the relocatable printer driver and taken it apart down to the last byte. I discovered a lot. For instance, I found out how to COPY the screen in single or double density mode. If you have an Epson printer, or a DMX-80, or a Panasonic printer, one POKE will change the density of the COPY to any density that your printer can handle. If you would like more information, write me, as the process can get complex.

Another thing that you may have heard about is the new operating system called the OS64. This is a cartridge available from either E. Arthur Brown or Zebra Systems. OS64 was mentioned in last month's RAMTOP, but I thought that more should be said about it. OS64 plugs into the cartridge port of the 2068. Flip the power on, and you are in 64 columns. There are no special commands to learn; you use the same old PRINT, EDIT, and LIST commands that you are used to using.

LLISTS and LPRINTS to the 2040 printer in 64 columns, too. Also, if you have a printer interface (parallel), such as the AERCO, TASHMAN, OLIGER, or the A & J interfaces, there is a printer driver built-in! Never load a driver from cassette again! OS64 becomes a natural part of the 2068 system. It is totally transparent to the user. NEW or CLEAR does not affect the operation in any way. As long as you have the OS64 in your cartridge slot, you will be in 64 columns. \$29.95 in the Zebra catalog.

If anyone out there would like a disassembly of the AERCO relocatable printer driver, just drop me a line. I will be happy to send it to you.

Over the holidays, I was again puttering around my listings box, and I found this: A new character set generator. This program generates a "pivot" font for the 2040 printer. What this means is, you can print sideways to the printer. This could be used to print 80 columns, then you could tape the strips together to make a page of text. To use it, POKE 23686,244 : POKE 23687,258. This will show the pivot font. To restore the regular character set, POKE 23686,0:POKE 23687,60.

```
7 DIM A$(8,8):DIM B$(8,8)
10 LET C=PEEK 23686+256*PEEK 23687+256
15 FOR J=33 TO 128
20 FOR P=0 TO 7
25 LET BYTE=PEEK (C+P+(J-32)*8)
30 LET Z$="BIN
35 FOR L=1 TO 8
40 LET X=INT (BYTE/2):LET BIT=BYTE-2*X:
LET BYTE=X:LET Z$(LEN Z$+L+1)=STR$
BIT
```

```
50 NEXT L:LET A$(P+1)=Z$(2 TO ):NEXT P
70 FOR F=1 TO 8:FOR N=1 TO 8:LET B$(N,F)
=A$(9-F,N):NEXT N:NEXT F
80 FOR P=0 TO 7:POKE (X+P+(J-32)*8),VAL
("BIN "+B$(P+1)):NEXT P
85 NEXT J
```

I hope you liked that one. I use it to print long bar graphs. Maybe some enterprising person might take the time ('cause I ain't gonna' do it!) to adapt that to other printers that can re-define their character sets???

I just bought copy of Tasword a few weeks ago, too. It seems to work pretty good. One problem is, when I set the Left Margin to 42, the text starts to double-space! I don't want that! If anyone can help me, please write to me with a solution! I can't figure out how to stop it.

Well, it's about time for me to go for this month. I have other articles to write. Take care!

If you have any questions or comments, please direct them to:

On-Line, c/o  
Eric Yruegas  
4786 Langley Ave.  
Whitehall, OH 43213

Thanks Eric for another fine article! I hope that all of you that use this material or that this is of interest, will drop Eric a note or letter!

\*\*\*\*\*

Here is a yet another banner program for the 2068. It looks like a winner! Thanks Gabel!

1 REM  
\*\*\*\*\*  
MAGNA-BANNER\*  
\*\*\*\*\*  
BY:GABRIEL SCHAFFER

2 BORDER 0: POKE 23624,6: LET  
①=255: CLEAR (256\*1-769): GO SU  
B 70: FOR i=0 TO 79: READ h: POK  
E (i+255\*109),h: NEXT i: POKE 2  
3692,0: REM MACHINE CODE LOADER

3 GO SUB 95: GO SUB 17: LET Z  
\$="MAGNA-BANNER": FOR x=1 TO 12  
STEP 2: LET P\$="": LET g\$="":  
LET a\$=Z\$(x): GO SUB 19: LPRINT  
y\$: IF INKEY\$<>"" THEN GO TO 9  
4 LET g\$="": LET P\$="": LET  
a\$=Z\$(x+1): GO SUB 19: LPRINT y  
\$: IF INKEY\$<>"" THEN GO TO 9  
5 NEXT x: REM LINES 3-5 PRINT  
PROGRAMMED TITLE BANNER



# Gabriel Schaffer's MAGNA - BANNER

```

6 BEEP 1,-10: PAUSE 100: FOR
k=65 TO 68: FOR a=1 TO 16: GO SU
B 125: LET a$=STR$ a: POKE 23692
,0: GO SUB 60: IF INKEY$<>"" THE
N GO TO 9: REM LINES 6-9 ARE THE
DEMO

```

```

7 IF a>12 THEN LET c=0: LET c
$=""

```

```

8 LET c=0: LET e=0: GO SUB 11
5: GO SUB 17: GO SUB 19: LPRINT
a: PRINT a: PAUSE 200: NEXT a: N
EXT k

```

```

9 IF INKEY$="" THEN GO TO 6:
REM LINES 10-17 ARE THE MAIN
PROGRAM

```

```

10 POKE 23607,60: INPUT "SIZE?
(1-16) ";a

```

```

11 INPUT "ENTER TYPE THAT YOU
WANT (BOLD,MODERN,ITALICS,REGUL
AR) ";z$: LET z$=z$+"1"

```

```

12 INPUT "ENTER YOUR MESSAGE "
;a$

```

```

13 INPUT "DO YOU WANT YOUR MES
SAGE IN THE CENTER OF THE PAPER,
IN THE TOP OF THE PAPER OR THE
BOTTOM OF THE PAPER? ";c$

```

```

14 INPUT "ENTER PRINT CHARACTE
R ";p$: INPUT "ENTER BACKGROUND
CHARACTER ";q$← JNAU

```

```

15 IF a$="" OR q$="" OR p$=""
OR a<1 OR a>16 OR (c$<>"C" AND c
$<>"C" AND c$<>"t" AND c$<>"T" A
ND c$<>"b" AND c$<>"B") OR (z$<>
"B1" AND z$<>"b1" AND z$<>"M1" A
ND z$<>"m1" AND z$<>"I1" AND z$<
>"i1" AND z$<>"R1" AND z$<>"r1")
THEN GO TO 5: REM CHECK FOR
INPUT ERRORS

```

```

16 GO SUB 17: GO SUB 19: GO TO
10

```

```

17 LET z=VAL z$: GO SUB z: C1$
: POKE 23692,0: LET v2 INT ((a/
4)+(1 AND a<>4 AND a<>8 AND a<>1
2 AND a<>16)): IF (c$<>"b" AND c
$<>"B") AND a<13 THEN LET e=32-(
v2/8): IF (c$="c" OR c$="C") AND
a<13 THEN LET e=e-(e/2)

```

```

18 RETURN

```

```

19 LET c$="": FOR d=1 TO e: LE
T c$=c$+" ": NEXT d: LET h$=q$(1
): LET q$=p$(1): FOR v=1 TO v2-1
: LET g$=q$+h$: LET p$=p$+q$: NE
XT v

```

```

20 FOR j=1 TO LEN a$: REM
LINES 19-45 ARE THE MAGNIFY SUB

```

```

21 LET co=PEEK 23693: POKE 236
93,INT (co/8)+8: PRINT AT 21,0;a
$(j): LET x$="": POKE 23693,co
23 REM x$=THE VARIABLE THAT
THE MAGNIFIED CHARACTER IS
STORED IN

```

```

30 FOR c=0 TO 7: FOR r=0 TO 7
35 IF POINT (c,r)=1 THEN LET x
$=x$+p$: GO TO 45
40 LET x$=x$+q$
45 NEXT r: NEXT c: PRINT AT 0,
0:

```

```

47 REM PRINT SUB

```

```

50 LET n2=v2/4+1: LET s=v2/8:
LET g2=v2/64: LET g3=s-1: REM
SET VARIABLES FOR PRINTING

```

```

55 FOR g=1 TO g2 STEP s: FOR n
=1 TO n2-a: LPRINT c$;x$(g TO g+
g3): PRINT c$;x$(g TO g+g3): NEX
T n: NEXT g: NEXT j: RETURN
57 REM RANDOM BACKGROUND &
PRINT CHARACTERS FOR THE DEMO

```

```

60 RANDOMIZE 0: LET c=INT (RND
+3): GO SUB 100: LET g=INT (RND+
26): LET g$=CHR$ (g+32): LET p$=
CHR$ (g+64): RETURN

```

```

63 REM EXTRA TYPE STYLES SUBS
(FROM AUGUST ISSUE OF RAMTOP
modified)

```

```

65 POKE 23607,60: RETURN

```

```

66 LET typ=2: POKE 23618,63: P
OKE 23619,0: POKE 23620,2

```

```

67 LET typ=1: POKE 23618,63: P
OKE 23619,0: POKE 23620,2

```

```

68 LET typ=0: RANDOMIZE USR (t
org+256+2-typ): POKE 23607,torg-
4: RETURN

```

```

70 LET torg=255: LET r=65: LET
r1=r: LET b=66: LET b1=b: LET m
=67: LET m1=m: LET i=68: LET i1=
i: REM VARIABLES FOR TYPE STYLE
LINE NUMBERS

```

```

75 RETURN

```

```

80 DATA 0,0,121,203,39,203,39,
50,21,255,33,0,51,17,0,torg-3

```

```

90 DATA 1,0,3,126,24,48,203,63
,24,44,230,112,24,37,121,230,7,2
03,39,50,40,255,126,24,30,24,28,
24,16,24,14,24,14,24,20,24,18,24
,2,200,63,203,63,24,10,203,39,20
3,39,24,4,183,203,39,182,18,35,1
9,11,120,177,32,196,201

```

```

93 REM MACHINE CODE FOR EXTRA
TYPE STYLES

```

```

95 LET c$="": LET e=0: LET z$=
"b1": LET j$="": LET u$="": LET
a=15: RETURN: REM INITIALIZE
PROGRAMMED BANNER VARIABLES

```

```

97 REM C$=WHETHER TO PRINT ON
THE BOTTOM,THE TOP OR THE CENTER
OF THE PAPER

```

```

100 LET c$=("b" AND c=0)+("c" A
ND c=1)+("t" AND c=2)

```

```

105 RETURN: REM SET C$ FOR THE
DEMO

```

```

110 REM k=WHETHER TO HAVE BOLD,
MODERN,ITALICS OR REGULAR PRINT
FOR THE DEMO

```

```

115 LET z$=("r1" AND k=65)+("b1
" AND k=66)+("m1" AND k=67)+("i1
" AND k=68)

```

```

120 RETURN: REM SET K FOR THE
DEMO

```

```

125 GO SUB b1: PRINT #1;AT 0,14
;"DEMO": GO SUB r1: RETURN

```

NOTE:

In your message, you may use ANY characters that you want-even graphics characters!



## PRINTING TRUE CURVES AND FIGURES WITH TS 2040 PRINTER

BY OLEG D. JEFIMENKO

Have you ever tried to copy drawings from the monitor screen with your 2040 printer? If you have, you know that the printer does not reproduce them correctly: circles become ellipses, squares become elongated and distorted, angles between slanted lines become enlarged or reduced. The reason for these changes is that 2040 printer uses a pixel grid with rectangular rather than with square cells (the original Sinclair printer used a pixel grid with square cells).

A simple adjustment of your PLOT or DRAW statements will produce geometrically correct prints of all curves, shapes, and patterns. All that you need to do is to divide the variable part of the x coordinates in the PLOT or DRAW statements by the "aspect ratio,"  $A=0.82$ , or to multiply the variable part of the y coordinates by the same ratio. The effect of such an adjustment can be demonstrated with the following examples.

Program 1 (TS 1000 or 1500) draws a diagonal square on the monitor screen. When the square is printed by using the COPY command, the printer changes it into a "diamond," or rhombus (Fig. 1).

Program 2 draws the same square but incorporates the aspect-ratio correction. The print is now a true square, although somewhat distorted because of the low resolution of the computer (Fig. 2). Incidentally, the expressions placed in parentheses in lines 20-50 of Programs 1 and 2 are the variable parts of the x and y coordinates. The constant parts are the coordinates of the center of the square,  $x=31$  and  $y=21$ . As mentioned above, only the variable parts need to be adjusted in order to produce correct prints.

Program 3 (TS 1000 or 1500) draws a circle on the monitor screen. When copied by the printer, the circle becomes an ellipse (Fig. 3).

Program 4 draws the same circle

corrected for aspect ratio. The print is now a true circle (Fig. 4).

Program 5 (TS 2068) draws slanted equilateral triangle on the monitor screen by using a DRAW statement (the same triangle can be drawn by using a PLOT statement, but DRAW is much faster). The printed copy of the triangle is badly distorted (Fig. 5).

Program 6 draws the same triangle corrected for aspect ratio. Now the triangle is equilateral, as it should be (Fig. 6).

Program 7 (TS 2068) draws a circle by using a CIRCLE statement. When copied, the circle becomes an ellipse (Fig. 7).

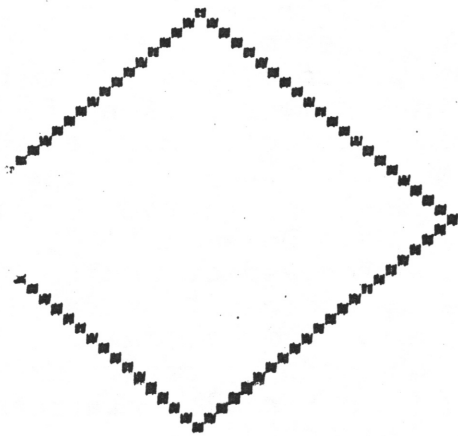
Program 8 draws the same circle by using a PLOT statement with aspect-ratio correction (there is no way to use the aspect-ratio correction with CIRCLE statements). The printed copy is a perfect circle (Fig. 8).

Naturally, you cannot use the same PLOT or DRAW statements to create a correct drawing both on the monitor screen and on the printout; one or the other will always be distorted.

What happens if you incorporate the aspect-ratio correction into the y coordinates rather than into the x coordinates? Remove the division by 0.82 in the above programs and multiply the variable parts of the y coordinates by 0.82 instead. The printed copies will be correct again, although smaller than before. For this reason it is usually safer to incorporate the aspect-ratio correction into the y coordinates: since the drawings become smaller, there is no danger of running out of screen when the correction is made.

As the final demonstration of the aspect-ratio correction, examine Figs. 9 and 10. They show the two ornamental designs created by Ted Knyszek (RAMTOP, December 1985, p. 3) corrected for aspect ratio. The original shapes were elliptical; the corrected ones are circular. The correction was made by using  $x/0.82$  instead of x in the DRAW statements of the original programs.

Thanks Professor Jefimenko! This is quite an extensive article!

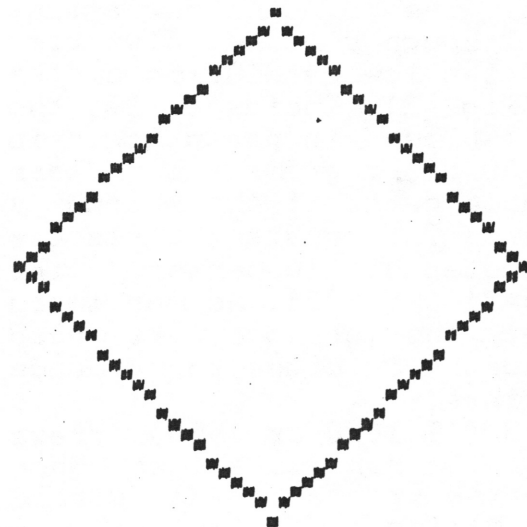


```

10 FOR X=0 TO 21
20 PLOT 31+X,21-(21-X)
30 PLOT 31+(21-X),21+X
40 PLOT 31-X,21+(21-X)
50 PLOT 31-(21-X),21-X
60 NEXT X

```

FIG. 1

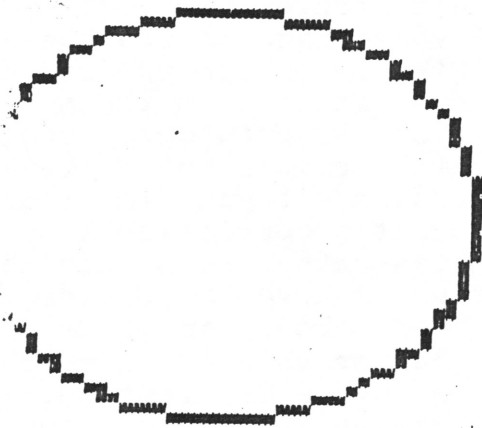


```

10 FOR X=0 TO 21
20 PLOT 31+X/.82,21-(21-X)
30 PLOT 31+(21-X)/.82,21+X
40 PLOT 31-X/.82,21+(21-X)
50 PLOT 31-(21-X)/.82,21-X
60 NEXT X

```

FIG. 2

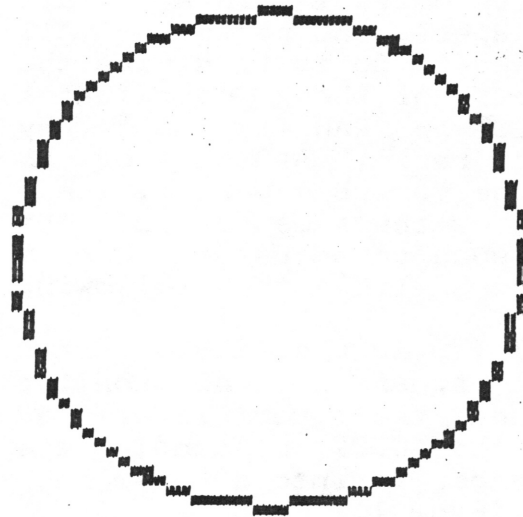


```

10 FOR T=0 TO 2*PI STEP 1/21
20 PLOT 31+21*COS T,21+21*SIN T
30 NEXT T

```

FIG. 3

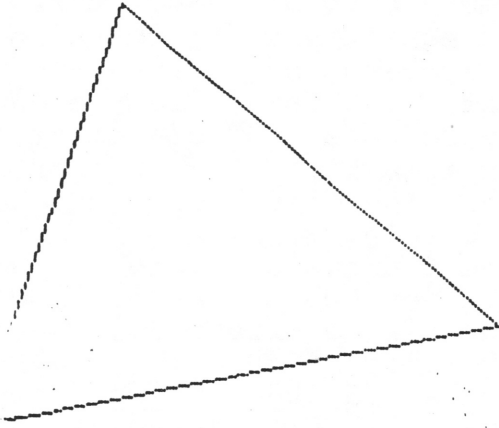


```

10 FOR T=0 TO 2*PI STEP 1/21
20 PLOT 31+21*COS T/.82,21+21*
SIN T
30 NEXT T

```

FIG. 4

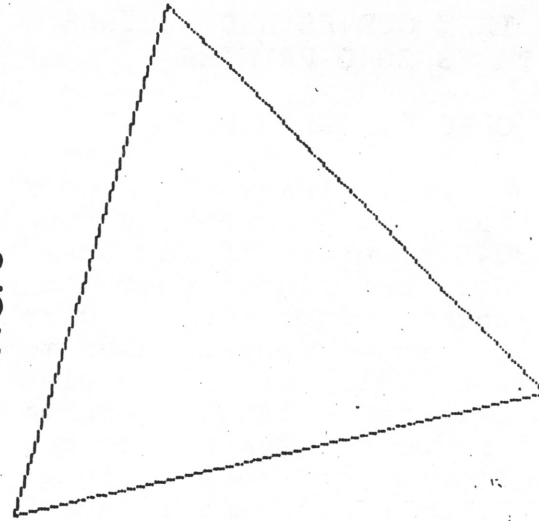


```

10 PLOT 40,174
20 DRAW 174*SIN (PI/12),-174
30 DRAW (174-174*SIN (PI/12)),
174-174*SIN (PI/12)
40 DRAW -174,174*SIN (PI/12)

```

FIG. 5

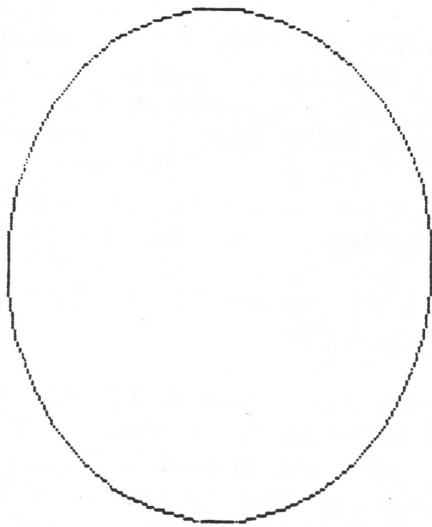


```

10 PLOT 40,174
20 DRAW 174*SIN (PI/12)/.82,-1
74 30 DRAW (174-174*SIN (PI/12))/
.82,174-174*SIN (PI/12)
40 DRAW -174/.82,174*SIN (PI/1
2)

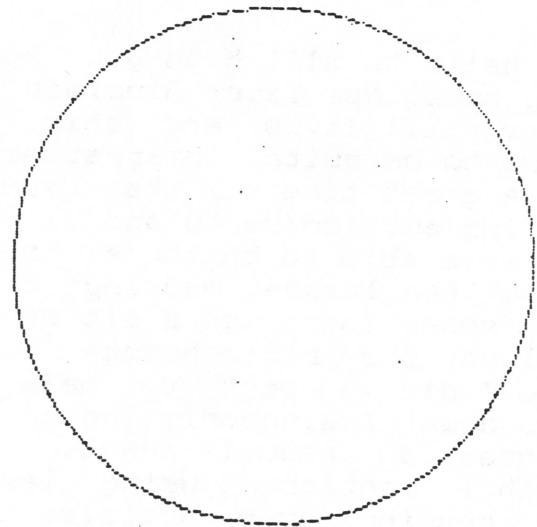
```

FIG. 6



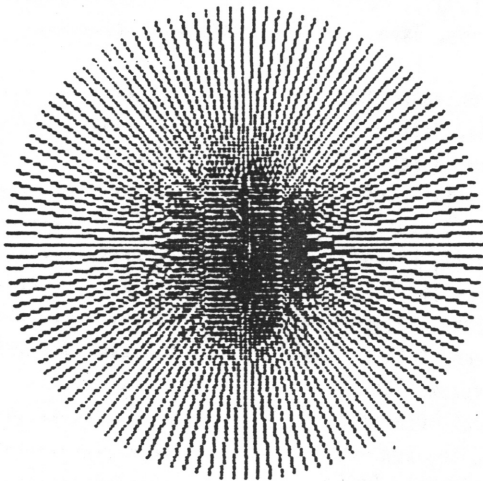
```
10 CIRCLE 128,87,87
```

FIG. 7



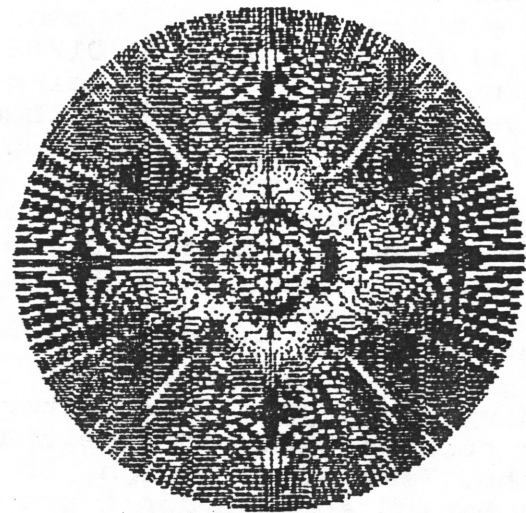
```
10 FOR T=0 TO 2*PI STEP 1/87
20 PLOT 128+87*COS T/.82,87+87
  *SIN T
30 NEXT T
```

FIG. 8



```
5 FOR A=0 TO 360 STEP 3
10 LET X=80*SIN (A*PI/180)
20 LET Y=80*COS (A*PI/180)
25 PLOT 128,87: DRAW X/.82,Y
30 NEXT A
```

FIG. 9



```
20 LET LI=400
30 LET A=0: LET ANG=2*PI/LI
40 FOR I=1 TO LI
50 LET X=85*COS A
60 LET Y=85*SIN A
70 PLOT 128,88
80 DRAW X/.82,Y
90 LET A=A+ANG
100 NEXT I
```

FIG. 10



## January Editorial

Hello to all! Hope you had a very happy New Year! Sinclair and Timex still lives and this year looks to be quite interesting. I had a great time at the December meeting/auction/party and I hope you were able to be there. It was one of the largest meetings that I have seen. There was a bit of overkill on the refreshments but I know I did my part to help cut them down! I sincerely hope this becomes an annual event. Last month I mentioned using Tasword and sending your articles on cassette. I got several articles this way and let me tell you, it is a BIG help! It cuts down on the retyping and allows me to print it in whatever size will fit the space.

I was looking through the files and found that there are quite a few of you that are due for dues! Please remember that your DUE date is printed on the address label in the upper right. I have a list here of those due from 11/01/85 through 02/01/86. In this new year we are going to strive to keep within our budget so that we can keep the club in the green and not the red! Last October and November things looked pretty tough but thanks to one of our newer members, AL GEDRIS, we are curbing the cost on the printing of the RAMTOP. In this new year we will have to stop sending you your newsletter if your dues fall behind more than 2 months. Take heart though, If you fall behind and you don't get one, we will have some extras at the meeting for \$1.50.

Our treasurer, Bob Parish, has done us a great service by taking the time to figure out the Master File program and configure it to work for the club membership and to print labels and reports. If you need a copy of the membership, feel free to ask me for it. I also must report that Bob just purchased a Tandy 1000. He therefore, he will be selling his 2068 as well as all the goodies that he has for it. These include: a 2040 printer, a 2050 modem,

a Taxan 210 RGB color monitor with the complete audio output. His 2068 has a Spectrum ROM with the switch, RGB board, a reset button, and a power indicator. He will also give with it all his software and books which is worth quite a lot! He is asking \$400 for the whole thing or \$250 for all but the monitor.

He also has a TI 99 4-A with 13 cartridges, a voice unit, and a lot of software. He is also including the cables, and a pair of remote joysticks. (\$200) If you are interested in either system give him a call at: 671-6922.

He tells me that he will still be an active member and remain treasurer. He is still is and will be in the future, interested in Timex and Sinclair computing.

### USER'S GROUP MEMBERSHIP DUES LIST

Gillespie, Doug	85/11/0
Hughes, Dave	85/11/0
Robertson, James	85/11/0
Shea, Bill	85/11/0
Shaw, Brian	85/11/0
Banasik, Paul	85/12/0
Burns, Dan	85/12/0
Cosari, Helen	85/12/0
Csicsila, Mell	85/12/0
Delaney, Ralph	85/12/0
Green, Arthur	85/12/0
Knyszek, Ted	85/12/0
Lucht, Clarence	85/12/0
McCabe, Don	85/12/0
Nordquest, David	85/12/0
Sieg, Dick	85/12/0
Simon, Thomas	85/12/0
Turk, Theodore	85/12/0
Wisnoskey, Richard	85/12/0
Singelton, Ray	85/12/0
Jefimenko, Oleg	86-01-
Fliegel, Andy	86/01/
Gill, Timothy	86/01/
Lavergne, John	86/01/
Radloff, Toby	86/02/

If your name is on this list please send your check for \$15 or \$7.50 to Bob Parish, 12706 Leeil Ave., Cleveland, Oh, 44135.

Here is another IRA program from Max Schoenfeld. This is an improved version of Max's previous IRA program.

# IRA REVISITED

Previously we presented a program to calculate and display the pay-out of an IRA account, requiring that the annual pay-out be uniform. That is one of four permissible methods of disbursing the funds. It is called "steady stream."

The following program demonstrates a second method, called "period certain option." Again, the pay-out period may not exceed the life expectancy of the account holder, but can be a lesser period. Take 20 years as an example. Then the first years distribution is found by dividing the account balance by 20. The next year, divide by 19, then 18, and so on.

We won't go into the other two methods. "Lump sum" doesn't need a program - and besides, taking all the money out the first year is a poor decision tax-wise. The last option, "adjusted period certain option" is similar to the program below, but you recalculate the life expectancy each year, thus stretching out the pay-out time. A program for this option would have to incorporate the life expectancy statistical tables.

Here goes:

```
10 REM "IRA pco"
20 REM Period Certain Option
25 REM - by Max Schoenfeld
100 INPUT "What is the beginning amount? ";a
110 INPUT "What is the assumed rate of interest? ";b
120 INPUT "How many years to pay out? ";c
130 PRINT "This program will give the annual pay-out for $";a;" starting amount, assuming a ";b;" rate of interest, for a period of ";c;" years."
135 PAUSE 200: CLS
150 PRINT "Year";TAB 5;"Pay-out";TAB 16;"Balance year end"
200 DIM d(20)
225 DEF FN j(d)=a*(1+b)
250 LET d(1)=FN j(1)/c
251 LET d(1)=(INT (100*d(1)+.5))/100
255 PRINT AT 2,0;1;AT 2,5;d(1)
256 LET z=FN j(1)-d(1)
257 LET z=(INT (100*z+.5))/100
258 PRINT AT 2,17;z
260 FOR x=2 TO c
270 LET a=FN j(x)-d(x-1)
280 LET d(x)=FN j(x)/(c-x+1)
281 LET z=d(x)
282 LET z=(INT (100*z+.5))/100
285 LET v=FN j(x)-d(x)
```

```
300 PRINT x;TAB 5;d(x);TAB 17;v
320 NEXT x
350 LET t=0
360 FOR x=1 TO c
370 LET t=t+d(x)
380 NEXT x
390 PRINT
395 LET t=(INT (100*t+.5))/100
400 PRINT "Total pay-out is ";t
```

This program will give the annual pay-out for \$ 20000 starting amount, assuming a .095 rate of interest, for a period of 20 years.

Year	Pay-out	Balance year end
1	1095	20805
2	1199.03	21582.45
3	1312.93	22319.85
4	1437.66	23002.58
5	1574.24	23613.58
6	1723.79	24133.08
7	1887.55	24538.17
8	2066.87	24802.43
9	2263.22	24895.44
10	2478.23	24782.28
11	2713.66	24422.93
12	2971.46	23771.65
13	3253.75	22776.22
14	3562.85	21377.11
15	3901.32	19506.61
16	4271.95	17087.79
17	4677.78	14033.35
18	5122.17	10244.34
19	5608.78	5608.78
20	6141.61	0

Total pay-out is \$ 59263.64

Here are some nice short programs for the 2068. They wer sent to me from Everett Pence. Thanks, Everett!

```
1 REM Perpetual Pattern by:
Everett Pence
10 FOR a=0 TO 175 STEP 2
20 PLOT a,a: DRAW 255-a*2,0
30 DRAW 0,175-a*2: DRAW -(255-a*2),0
40 DRAW 0,-(175-a*2)
50 NEXT a
100 FOR a=0 TO 175 STEP 2
110 PLOT a,a: DRAW 255-a*2,0
120 DRAW 0,175-a*2: DRAW -(255-a*2),0
130 DRAW 0,-(175-a*2)
140 NEXT a
200 FOR a=175 TO 0 STEP -2
210 PLOT a,a: DRAW 255-a*2,0
220 DRAW 0,175-a*2: DRAW -(255-a*2),0
230 DRAW 0,-(175-a*2)
240 NEXT a
250 GO TO 10
```

```

1>REM Tower of Hanoi: Move
all the disks (1-5) from #1 to #
3; a smaller disk can rest on a
larger one ex. 542 but not a
large one on a small one 5324.
Input row to move from, then row
to move to. Good Luck!

```

```

5 CLS
10 DIM a$(3,6): DIM a(3): LET
t=0
40 LET a$(1)="54321-"
50 LET a$(2)="-----"
60 LET a$(3)=a$(2)
70 LET a(1)=5
80 PRINT AT 0,0;"Move-";t
90 PRINT
100 FOR a=1 TO 3
110 PRINT a$(a);TAB 8;"#";a
120 PRINT
130 NEXT a
140 IF a$(3)="54321-" THEN GO TO 290
150>PRINT "from": INPUT a: PRINT
T a
180 PRINT "to": INPUT b: PRINT
b
200 LET t=t+1
220 LET a(b)=a(b)+1
230 LET a$(b,a(b))=a$(a,a(a))
240 LET a$(a,a(a))="-"
250 LET a(a)=a(a)-1
260 IF a(b)<2 THEN GO TO 80
270 IF a$(b,a(b))>a$(b,a(b)-1)
THEN GO TO 350

```

```

280 GO TO 80
300 PRINT "you did it!"
320 PRINT "in ";t;" moves"
330 PAUSE 0
340 RUN
360 PRINT "You cheated"
370 PRINT "you lose"
390 GO TO 330

```

```

1 REM Moire designs by:
EVERETT PENCE
5 INPUT "What step do you want? ";step
7 OVER 1
10 FOR a=0 TO 255 STEP step
20 LET b=255-a
30 PLOT a,175: DRAW b-a,-175
40 NEXT a
50 FOR a=0 TO 175 STEP step
60 LET b=175-a
75 PLOT 0,a: DRAW 255,b-a
80 NEXT a

```

10

From:  
 THE GREATER CLEVELAND SINCLAIR USERS GROUP  
 James G. DuPuy (Editor)  
 6514 Bradley Ave.(Down)  
 Parma, Ohio 44129

TO:

FIRST CLASS MAIL